

## ABSTRACT OF THE INVENTION

The present invention is directed to a radiographic apparatus, and its method of manufacture, that utilizes a single integral housing for providing an evacuated envelope for an anode and cathode assembly. The integral housing is preferably formed from a substrate material, such as Kovar, that has a radiation shielding layer, which is comprised of a powder metal that is deposited with a plasma spray process. The powder metal includes, for example, tungsten and iron, so that the radiation shield layer provides sufficient radiation blocking and heat transfer characteristics such that an additional external housing is not required. In an alternative embodiment, the integral housing is composed of a solidified integrated mixture of metallic powders that function together as both the integral housing wall and the radiation shielding. The integral housing is air cooled, and thus does not utilize any liquid coolant. In addition, the assembly utilizes a dielectric gel polymer material to electrically insulate electrical connections on the housing.

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